

Application No. 09/889,571
Response dated July 19, 2004
Reply to Office Action of April 21, 2004

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (currently amended): A production method of a vinyl polymer having a functional group at a molecular chain terminus

which comprises adding a compound (I) having a first functional group and a second functional ~~an internal alkenyl~~ group either during polymerization or at the end point of polymerization to thereby introduce said first functional group into a molecular chain terminus of the polymer in the living radical polymerization of a radical-polymerizable vinyl monomer, wherein the second functional group is an internal alkenyl group.

Claim 2 (currently amended): The production method according to Claim 1, wherein the first functional group to be introduced into a molecular terminus is a hydroxyl, amino, epoxy, carboxyl, ester, ether, amido, crosslinking silyl or terminal or internal alkenyl group.

Claim 3 (currently amended): The production method according to Claim 2, wherein the first functional group to be introduced into a molecular terminus is a hydroxyl, amino, epoxy, crosslinking silyl or terminal or internal alkenyl group.

Claim 4 (currently amended): The production method according to Claim 3,
wherein the first functional group to be introduced into a molecular terminus is a terminal
or internal alkenyl group.

Claim 5 (currently amended): The production method according to Claim 1,
wherein the compound (I) is ~~a functional group containing cyclic olefin~~ a cyclic olefin
further having said first functional group.

Claim 6 (currently amended): The production method according to Claim 5,
wherein ~~the compound (I) is a terminal alkenyl containing cyclic olefin or an internal~~
~~alkenyl containing cyclic olefin~~ said first functional group is a terminal or internal alkenyl group.

Claim 7 (original): The production method according to Claim 6,
wherein the compound (I) is 4-vinylcyclohexene or 1,5-cyclooctadiene.

Claim 8 (previously presented): The production method according to Claim 1,
wherein the living radical polymerization is carried out in the manner of atom transfer
radical polymerization.

Claim 9 (original): The production method according to Claim 8,
wherein a complex of copper, nickel, ruthenium or iron is used as a metal complex catalyst.

Claim 10 (original): The production method according to Claim 9,
wherein a copper complex is used as the metal complex catalyst.

Claim 11 (previously presented): The production method according to Claim 8,
wherein an organic halide having a functional group in addition to an initiation site or a
halosulfonyl compound having a functional group in addition to an initiation site is used as an
initiator.

Claim 12 (previously presented): The production method according to Claim 8,
wherein an initiator having a plurality of initiation sites is used as an initiator.

Claims 13-18 (canceled)

Claim 19 (withdrawn): A vinyl polymer
having a crosslinking silyl group at a molecular chain terminus
and being producible by reacting a vinyl polymer, which has an alkenyl group at a
molecular chain terminus and is producible by the production method according to Claim 1, with
a crosslinking silyl-containing hydrosilane compound.

Claim 20 (withdrawn): A vinyl polymer
having a crosslinking silyl group at a molecular chain terminus

and being producible by reacting a vinyl polymer, which has a hydroxyl or amino group at a molecular chain terminus and is producible by the production method according to Claim 1, with a crosslinking silyl-containing compound having a functional group capable of reacting with a hydroxyl or amino group.

Claim 21 (withdrawn): A curable composition comprising:

(A) a vinyl polymer, which has an alkenyl group at a molecular chain terminus and is producible by the production method according to Claim 1,
and (B) a compound having at least two hydrosilyl groups.

Claim 22 (withdrawn): A curable composition comprising:

(A) a vinyl polymer, which has a hydroxyl or amino group at a molecular chain terminus and is producible by the production method according to Claim 1,
and (B) a compound having at least two functional groups capable of reacting with a hydroxyl or amino group.

Claim 23 (withdrawn): The curable composition according to Claim 22, wherein the component (B) is a polyisocyanate.

Claim 24 (withdrawn): A curable composition comprising:

a vinyl polymer, which has a crosslinking silyl group at a molecular chain terminus and is producible by the production method according to Claim 1.

Claim 25 (withdrawn): A curable composition comprising:

(A) A vinyl polymer, which has an epoxy group at a molecular chain terminus and is producible by the production method according to Claim 1,
and (B) a curing agent for epoxy resins.

Claim 26 (withdrawn): A production method of a vinyl polymer having a functional group at a molecular chain terminus

which comprises adding a conjugated polyene compound (II) to thereby introduce the functional group derived from the compound (II) into the polymer at a molecular chain terminus in living radical polymerization of a radical-polymerizable vinyl monomer.

Claim 27 (withdrawn): The production method according to Claim 26, wherein the functional group to be introduced into a molecular chain terminus is a hydroxyl, amino, epoxy, carboxyl, ester, ether, amido, crosslinking silyl or terminal or internal alkenyl group.

Claim 28 (withdrawn): The production method according to Claim 27, wherein the functional group to be introduced into a molecular chain terminus is a hydroxyl, amino, epoxy, crosslinking silyl or terminal or internal alkenyl group.

Claim 29 (withdrawn): The production method according to Claim 28,

wherein the functional group to be introduced into a molecular chain terminus is a terminal or internal alkenyl group.

Claim 30 (withdrawn): The production method according to Claim 26,
wherein a conjugated polyene structure in the conjugated polyene compound (II) is a conjugated diene structure.

Claim 31 (withdrawn): The production method according to Claim 30, wherein the conjugated polyene compound (II) is isoprene, piperylene or butadiene.

Claim 32 (withdrawn): The production method according to Claim 26,
wherein the living radical polymerization is carried out in the manner of atom transfer radical polymerization.

Claim 33 (withdrawn): The production method according to Claim 32,
wherein a complex of copper, nickel, ruthenium or iron is used as a metal complex catalyst.

Claim 34 (withdrawn): The production method according to Claim 33,
wherein a copper complex is used as a metal complex catalyst.

Claim 35 (withdrawn): The production method according to Claim 32,
wherein an organic halide having a functional group in addition to an initiation site or a

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halosulfonyl compound having a functional group in addition to an initiation site is used as an initiator.

Claim 36 (withdrawn): The production method according to Claim 32,
wherein an initiator having a plurality of initiation sites is used as an initiator.

Claim 37 (withdrawn): The production method according to Claim 26,
wherein the conjugated polyene compound (II) is added at the end point of the
polymerization reaction.

Claim 38 (withdrawn): A vinyl polymer
having a functional group at a molecular chain terminus
and being obtainable by treating a vinyl polymer, which has the functional group at a
molecular chain terminus and is obtainable by the production method according to Claim 26, with
an alkaline compound to thereby eliminate the remaining terminal halogen.

Claim 39 (withdrawn): A vinyl polymer
having a functional group at a molecular chain terminus
and being obtainable by the production method according to Claims 26.

Claim 40 (withdrawn): The polymer according to Claim 39,
wherein the vinyl polymer is a (meth)acrylate polymer.

Claim 41 (withdrawn): The polymer according to Claim 40,
wherein the vinyl polymer is an acrylate ester polymer.

Claim 42 (withdrawn): The polymer according to Claim 41,
wherein the vinyl polymer is a butyl acrylate polymer.

Claim 43 (withdrawn): The polymer according to Claim 39
which has a number average molecular weight of 500 to 100,000.

Claim 44 (withdrawn): The polymer according to Claim 39
which has a weight average molecular weight (Mw) /number average molecular weight
(Mn) ratio (Mw/Mn) of less than 1.8 as determined by gel permeation chromatography.

Claim 45 (withdrawn): A vinyl polymer
having a crosslinking silyl group at a molecular chain terminus and
being producible by reacting a vinyl polymer, which has an alkenyl group at a molecular
chain terminus and is producible by the production method according to Claim 26, with a
crosslinking silyl-containing hydroxilane compound.

Claim 46 (withdrawn): A vinyl polymer
having a crosslinking silyl group at a molecular chain terminus

and being producible by reacting a vinyl polymer, which has a hydroxyl or amino group at a molecular chain terminus and is producible by the production method according to Claim 29, with a crosslinking silyl-containing compound having a functional group capable of reacting with a hydroxyl or amino group.

Claim 47 (withdrawn): A curable composition comprising:

(A) a vinyl polymer, which has an alkenyl group at a molecular chain terminus and is producible by the method according to Claim 26,
and (B) a compound having at least two hydroxyl groups.

Claim 48 (withdrawn): A curable composition comprising:

(A) a vinyl polymer, which has a hydroxyl or amino group at a molecular chain terminus and is producible by the production method according to Claim 29,
and (B) a compound having at least two functional groups capable of reacting with a hydroxyl or amino group.

Claim 49 (withdrawn): The curable composition according to Claim 48, wherein the component (B) is a polyisocyanate.

Claim 50 (withdrawn): A curable composition comprising:

a vinyl polymer, which has a crosslinking silyl group at a molecular chain terminus and is producible by the production method according to Claim 29.

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Claim 51 (withdrawn): A curable composition comprising:

(A) a vinyl polymer, which has an epoxy group at a molecular chain terminus and is producible by the production method according to Claim 29,

and (B) a curing agent for epoxy resins.